

Notice of Allowability

Application No.

10/796,587

Examiner

John S. Chu

Applicant(s)

NAIINI ET AL.

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12/7/05.
2. ☒ The allowed claim(s) is/are 1-79.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

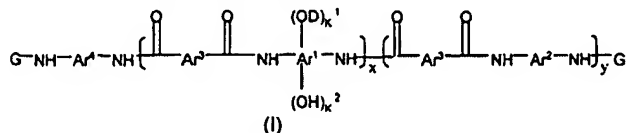
1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 12/7/05.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

1. The following is an examiner's statement of reasons for allowance: The claimed invention is drawn to the following:

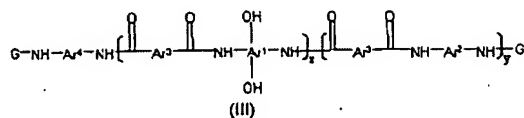
$$\begin{array}{c} \text{G}-\text{NH}-\text{Ar}^1-\text{NH}\left(\text{C}(=\text{O})\text{Ar}^2\right)_x\left[\text{N}(\text{OH})_{k^1}-\text{Ar}^1-\text{NH}\right]_y\left(\text{C}(=\text{O})\text{Ar}^2\right)_z\text{NH}-\text{G} \\ | \\ (\text{OH})_{k^2} \end{array} \quad (I)$$

(IIa) (IIb) (IIc) (IId) (IIe)

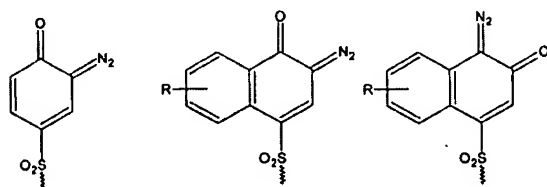
(a) at least one polybenzoxazole precursor polymer selected from the group consisting of polymers having Structure I and III;



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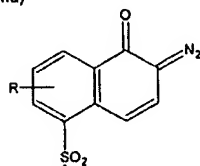
wherein Ar^1 is selected from the group consisting of a tetravalent aromatic group, a tetravalent heterocyclic group and mixtures thereof; Ar^2 is selected from the group consisting of a divalent aromatic, a divalent heterocyclic, a divalent alicyclic and a divalent aliphatic group that may contain silicon and mixtures thereof; Ar^3 is selected from the group consisting of a divalent aromatic group, a divalent aliphatic group, a divalent heterocyclic group and mixtures thereof; Ar^4 is selected from the group consisting of Ar^1 $(\text{OH})_2$ and Ar^2 ; D is selected from the group consisting of one of the following moieties IIa-IIe:



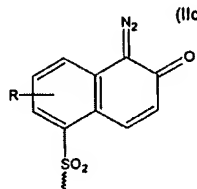
(IIa)

(IIb)

(IIc)



(IIId)

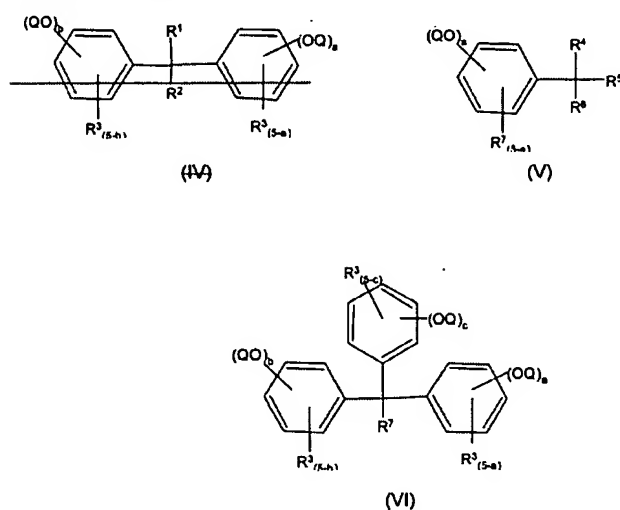


(IIe)

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wherein, R is selected from the group consisting of H, a C₁ – C₄ alkyl group, a C₁ – C₄ alkoxy group and a cyclohexyl group; k¹ can be any positive value of up to about 0.5, k² can be any value from about 1.5 to 2 with the proviso that (k¹+k²)=2, x is from about 10 to about 1000; y is from about 0 to about 900; and G is an organic group having a carbonyl, carboxy or sulfonyl group attached directly to the terminal NH of the polymer,

(b) at least one non-polymeric photosensitive compound comprising a compound having within its structure one or more of moieties selected from the group consisting of IIa-IIe, with the proviso that if a polymer of Structure III is the sole polybenzoxazole precursor polymer, the non-polymeric photosensitive compound is selected from the group consisting of compounds described by structures IV–VI, V–VI,



wherein R¹, R², R⁴, R⁵, R⁶ and R⁷ each independently are selected from the group

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consisting of a linear or branched C₁ - C₄ alkyl group, a phenyl or halide substituted C₁ - C₄ linear or branched alkyl group, a perfluorinated C₁ - C₄ linear or branched alkyl group, a C₅ - C₇ cycloalkyl group, a C₁ - C₄ alkyl or halide substituted C₅ - C₇ cycloalkyl group, or alternatively R¹ and R² or any two of R⁴, R⁵, and R⁶ may together form a 5-7 membered ring; each R³ is independently selected from the group consisting of H, a linear or branched C₁ - C₄ alkyl group, a phenyl or halide substituted C₁ - C₄ linear or branched alkyl group, a perfluorinated linear or branched C₁ - C₄ alkyl group, a C₅ - C₇ cycloalkyl group, a C₁ - C₄ alkyl or halide substituted C₅ - C₇ cycloalkyl group, an unsubstituted phenyl group, and a phenyl or alkyl or halide substituted phenyl group; Q is selected from the group consisting of H or D with the proviso that at least one Q = D; D is selected from the group consisting of one of the moieties IIa-IIe; a is an integer from 1 to 5; b and c are integers from 0 to 5 with the provisos: (1) that for Structure IV, if a = b = 1 and both OQ are substituted para to the R¹R²C substituent, then both R¹ and R² are not simultaneously methyl, and (2) 1 ≤ a+b ≤ 6; and the proviso that for Structure VI, if a = b = c = 1 and all OQ are para to the triphenyl methane carbon substituent, then at least one R³ is not H; and

(c) at least one solvent.

Claims 23, 26, 29, 30, 37, 43 and 54 are objected to under 37 CFR 1.75(c), previously objected to is now being seen as definite and clear and the objection is **withdrawn**.

The rejection under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention is also **withdrawn** based on the discussion during the telephonic interview (see attached PTOL-413).

None of the prior art references of record disclose the recited end-capped polybenzoxazole precursor having the formula of structure I having photosensitive groups defined as D condensed at the hydroxyl position in a composition with a photosensitive compound (b) and a solvent (c). The claims further define the preferred photosensitive naphthoquinone diazide compound for component (b) to have a phenolic backbone structure of formula V and VI as seen in claim 12. The closest prior art reference made of record is to TAKAHASHI et al (6,376,151) which discloses the use of the following compound having the

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structure of the photosensitive component. Here applicants have defined the difference between the interpretation of an alkyl substituted phenylene which was the interpretation by the Office from the claimed phenyl substituted alkyl group defined for variable R⁵. The examiner concurs with the definition and interpretation as described by applicant in the Remarks of October 31, 2005, pp. 2-5.

Because none of the prior art references of record anticipate or render obvious the claimed invention, all the claims, claims 1-79 are seen as allowable and passed to issue.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Chu whose telephone number is (571) 272-1329. The examiner can normally be reached on Monday - Friday from 9:30 am to 6:00 pm.

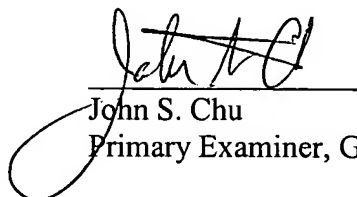
The fax phone number for the USPTO is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-1700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PMR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John S. Chu
Primary Examiner, Group 1700

J.Chu
December 7, 2005